REMARKS:

1) In accordance with the PCT procedures, the original specification of this application was a direct literal translation of the foreign language text of the corresponding PCT International Application. The specification has now been amended editorially and formally to better comport with typical US Application format. For example, section headings have been added, and specific references to particular claim numbers have been avoided in the written description. Accordingly, please withdraw any objection to the specification.

2) Referring to section 1 on page 2 of the Office Action, the objection to the drawings is respectfully traversed. The reference numbers 1 and 26 appear in Fig. 1 of the drawings as originally filed. See reference number 1 at the bottom center of Fig. 1, and reference number 26 at the upper left side of Fig. 1. Also, the specification has been amended at page 11 line 20 to correct the reference number for the "wear lining" from "40" to "14". The reference number 14 appears in Fig. 1 of the drawings. For the above reasons, please withdraw the objection to the drawings.

3) Further according to the PCT procedures, the original claims of this application were based on a direct literal translation of the foreign language claims of the corresponding PCT International Application. The claims have now been amended editorially and formally to avoid grammatical constructs of a

direct literal translation, to streamline and improve consistency of the terminology, and to better comport with US claim style and format. Additionally, independent claim 1 has been amended substantively to recite that the gap seals are positioned at radially outer ends of the cellular wheel webs with a radial spacing gap between the gap seal and the cylindrical wall of the housing of the cellular wheel sluice. This feature is supported in the original written description for example at page 12 lines 1 to 16, and thus does not introduce any new matter. New claims 17 to 28 have been added to recite additional features of the invention supported in the original disclosure as shown in the following table. The new claims have been drafted "from the ground up" as a fresh approach at covering inventive subject matter with different claim style and terminology in comparison to the original literally translated PCT claims. Claims 17 to 19 depend from claim 1, claim 20 is a new independent claim, and claims 21 to 28 depend from claim 20. In view of the original support as shown in the following table, the new claims do not introduce any new matter. Entry and consideration of the claim amendments and the new claims are respectfully requested.

new claims	17	18	19	20	21	22
original support	P 12 L 4	P 8 L 16-26, P 9 L 26-27, P 10 L 3-9, Fig. 2	Cl 10 P 8 L 16-26, P 9 L 26-27, P 10 L 3-9, Fig. 2	Cl 1; P 6 L 12-20, P 8 L 1- P 10 L 13, P 12 L 1-6, Fig. 1, 2	P 12 L 4	P 8 L 16-26, P 9 L 26-27, P 10 L 3-9, Fig. 2

new claims	23	24	25	26	27	28
original support	Cl 10 P 8 L 16-26, P 9 L 26-27, P 10 L 3-9, Fig. 2	P 11 L 7-19 Cl 12	Fig. 2; Cl 13; P 4 L 24-26; P 11 L 8-15	Cl 14; P 11 L 20-26	Cl 15	Cl 15

4) Referring to sections 2 to 4 on page 3 of the Office Action, the rejection of claims 1, 2 and 10 to 16 as indefinite under 35 USC 112(2) is respectfully traversed.

The Examiner's interpretation of claim 1 as requiring the gap seals to be "made of metal" is incorrect. The gap seals are not necessarily made of a metal, but rather they are made of a material that is as hard as a metal. It is respectfully submitted that if a person of ordinary skill in the art can understand the phrase "made of metal", then such a person can also understand the recitation that the gap seals are made of "a material as hard as a metal". This simply requires that the material is as hard as any selected metal. The hardness of a material is well understood and characterized, and can be measured by known hardness measuring techniques. Therefore, there is no ambiguity in the phrase "made of a material as hard as a metal". Just as the phrase "made of metal" extends to any selected metal, the phrase "as hard as a metal" extends to all materials that have a hardness equivalent to that of any selected metal. While this is a broad scope, it does not involve ambiguity or indefiniteness.

The positive introduction and antecedent basis of "the dosing chambers" has been improved in the current amendment of claim 1.

For the above reasons, the Examiner is respectfully requested to withdraw the rejection under 35 USC 112(2).

5) Referring to section 6 on pages 4 to 7 of the Office Action, the rejection of claims 1, 2 and 10 to 12 as obvious over US Patent 4,978,252 (Sperber) in view of US Patent 4,844,101 (Hirsch et al.) and US Patent 3,708,890 (Weisselberg) is respectfully traversed.

Currently amended independent claim 1 is directed to a cellular wheel sluice constructed as an axial blow through sluice that comprises a cellular wheel with radial cellular wheel webs having gap seals provided at radial outer ends of the cellular wheel webs. The cellular wheel is arranged to be rotatable about a horizontal axis in a housing having a cylindrical wall and vertical side walls. A blow-in hole is provided in one of the side walls and a blow-out hole is provided in the other one of the side walls. A particulate bulk material such as secondary fuel material can be supplied through a supply chute into dosing chambers formed between the successive cellular wheel webs. Transport air can be blown into the blow-in hole and thereby transports the bulk material out through the blow-out hole in a metered or dosed manner.

A problem suffered by conventional blow-through cellular wheel sluices is that the pressurized transport air blown into the blow-in hole can leak past the gap seals or radial outer ends of the cellular wheel webs and thereby flow up through the supply chute opposite the bulk material supply direction. This wastes transport air and diminishes the accuracy of the metering or dosing. The prior art (as will be discussed below and as discussed in the present specification) has made efforts to address the air leakage problem in two ways. First the prior art

attempts to improve the seal between the gap seals and the inner surface of the cylindrical housing wall by providing wiping seals that actually contact and wipe along the inner surface of the cylindrical wall. Second, the prior art has attempted to overcome the leakage problem by venting the leakage air.

Contrary to and distinct from the prior art efforts to deal with the leakage problem, the invention has taken a completely different approach. Instead of providing wiping contact seals that actually contact and wipe along the inner surface of the cylindrical housing wall, the invention instead purposely provides a radial spacing gap between the gap seals and the cylindrical housing wall. While such a gap would ordinarily seem to permit increased leakage of air through the gap, such air leakage is avoided by the invention by establishing particular pressure conditions, and especially a reduced pressure within the respective active dosing chamber. This is achieved by arranging an injection nozzle at the blow-in hole, so that the injection nozzle is adapted to blow the transport air through the blow-in hole into the dosing chamber. The injection nozzle action establishes a high blow-in velocity and thus a reduced pressure of the blown-in transport air. Then, as the transport air continues axially through the dosing chamber, it expands and slows down and thus reaches a lower speed and higher pressure by the time it exits the dosing chamber at the blow-out hole, where the transport air may then again be slightly accelerated into a discharge pipe. This injection of the transport air thus produces a differential pressure that creates reduced pressure

zones at the gaps along the gap seals, and this reduced pressure prevents air from leaking out through these gaps. See the specification at page 4 lines 10 to 23 and page 12 line 13 to page 13 line 23.

As a result, the invention provides a synergistically effective combination of a transport air injection nozzle at the blow-in hole, with a purposeful radial spacing gap between the gap seals and the inner surface of the cylindrical housing wall. Still further, to increase the durability and the operating life of the gap seals, the gap seals are made of a material that is as hard as a metal, for example instead of the soft rubber seals that were used in the prior art. It is possible to use such a hard seal according to the invention, because the gap seals do not contact the inner surface of the cylindrical housing wall, but rather a radial spacing gap is purposely provided between the gap seals and the cylindrical housing wall. Any material that is as hard as a metal can be used for the gap seals, for example various metals or metal alloys, or hard ceramics, or the like.

The prior art would not have suggested the inventive combination of features as discussed above and recited in claim 1.

As acknowledged by the Examiner, Sperber does not disclose the use of a transport air injection nozzle, and also does not disclose gap seals made of a material that is as hard as a metal. Instead of such a combination of features as according to the present invention, Sperber follows a very different approach at solving the leakage air problem. First, Sperber provides special seal members 78 adjustably provided at the radially outer ends

of the radial vane members 74, such that the seal members 78 adjustably extend out from the vane members 74 so that the ends of the seal members 78 purposely **engagingly contact** the inner cylindrical wall of the housing 68 to form a seal between the seal member 78 and the cylindrical housing 68 (col. 5 lines 1 to 5 and col. 2 lines 40 to 47). Thus, Sperber purposely and expressly teaches directly away from the inventive feature of purposely providing a radial spacing gap between the gap seals and the cylindrical housing wall. Directly contrary to the invention, Sperber provides special adjustment devices to ensure a continuous sliding contact of the seal members 78 onto the inner cylindrical housing wall 68 so as to close any gap and form a seal that is as tight as possible to minimize the air leakage.

Secondly, Sperber provides leakage air vent passages 114a and 114b that purposely vent away any transport air that leaks past the gap seals (see col. 5 lines 56 to 62 and col. 6 lines 46 to 55). These vent passages 114a and 114b acknowledge that air leakage is a problem, and purposely provide a venting outlet for the leakage air so that it does not blow back into the bulk material supply hopper or chute.

From the above teachings of Sperber, a person of ordinary skill in the art would not have been motivated to purposely provide radial spacing gaps between the gap seals and the cylindrical housing wall, and instead avoid air leakage by changing the pressure conditions within the dosing chamber through the use of an injection nozzle. The radial spacing gaps are directly contrary to the teaching of Sperber to provide direct contact between the gap seals and the cylindrical housing

wall, and the provision of leakage air vent passages according to Sperber is superfluous and contrary to the use of a transport air injection nozzle that avoids air leakage by changing the pressure profile in the dosing chamber. Therefore, based on reading the Sperber disclosure, a person of ordinary skill in the art would not have been motivated to make modifications toward the present invention, or to consider additional references providing teachings allegedly toward the present invention.

For example, the Examiner has additionally applied Hirsch et al. for teaching a cellular wheel sluice that uses an injection nozzle. However, Hirsch et al. provide the injection nozzle for the purpose of expanding or puffing-up tobacco particles to achieve an increased filling power of the tobacco. That would not have been a motivating factor in the apparatus and system of Sperber for conveying fireproofing, insulation, acoustical materials and the like. Still further, Hirsch et al. also do not suggest that a transport air leakage problem is avoided by the use of the injection nozzle. Namely, Hirsch et al. also disclose that the expansion chamber or dosing chamber into which the transport air is injected "may be sealed very tightly so that the entire gas supplied to said expansion chamber is available for the expansion and the pneumatic transport of the tobacco material" (col. 2 lines 50 to 53, underlining added). Thus, even a combined consideration of the teachings of Hirsch et al. with those of Sperber would have led a person of ordinary skill in the art to try to achieve the tightest seal possible of the radial web gap seals against the inner surface of the cylindrical housing wall. That is directly contrary to the

present inventive requirement of purposely leaving a radial spacing gap between the gap seals and the cylindrical housing wall.

Still further, the Examiner has additionally applied Weisselberg for teaching a rotary airlock apparatus that has blade segments 162 and 164 acting as gap seals made of metal. However, the rotary airlock apparatus of Weisselberg is not an axial blow-through cellular sluice like that of the invention or that of Sperber or that of Hirsch et al. The functions and operating requirements of the rotary airlock of Weisselberg are quite different from those of the axial blow-through cellular wheel sluice. Namely, Weisselberg is purposely trying to achieve an airlock in a flow conduit, where the flow passes into the top opening 18 and out of the bottom opening 20 in a direction transverse to the axis of the rotary airlock. There is no transport of bulk material axially in the axial direction from a blow-in hole in one vertical sidewall to a blow-out hole in the other vertical sidewall, so that the airflow and pressure conditions are very different. Namely, Weisselberg does not have to deal with pressurized air being fed or injected into an otherwise closed dosing chamber so as to flow axially through this dosing chamber, but rather Weisselberg merely needs to achieve an air blockage between the upper opening 18 and lower opening 20. Basically, the rotary airlock of Weisselberg operates like a typical revolving door that allows persons to pass through without letting wind blow through the door passage. Accordingly, the teachings of Weisselberg have little relation

to an axial blow-through cellular wheel sluice, and would not have been combined with those of Sperber and Hirsch et al.

Nonetheless, even considering the teachings of Weisselberg in combination with those of Sperber and Hirsch et al., those combined teachings are still directly contrary to the present invention. Just as taught by Sperber and Hirsch et al. discussed above, Weisselberg also teaches to establish a direct contact between the gap seals 62 and the cylindrical housing wall 14, in order to establish an air-tight seal (col. 1 lines 60 to 64, col. 3 line 52 to col. 4 line 11). Thus, while Weisselberg teaches that such seal members that make a wiping engagement or contact along the inner surface of the cylindrical housing wall can be made of metal, there is no suggestion toward instead arranging a gap seal that is made of a material as hard as a metal with a purposeful radial spacing gap between the gap seal and the adjoining cylindrical housing wall.

For the above reasons, the invention of present claim 1 would not have been obvious over a combined consideration of the prior art. The dependent claims are patentably distinguishable over the prior art already due to their dependence. Furthermore, the additional features of claim 10 are not disclosed or suggested by the prior art, contrary to the Examiner's assertion. Namely, the small circular blow-out hole 84 of Sperber does not have the triangular cross-sectional shape and does not have the larger cross-sectional area of the dosing chamber or pocket 80 (see Fig. 4). Contrary to present claim 12, the prior art does not disclose gap seals constructed as cutting edges. In this regard the Examiner has referred to the blade segments 162 and

164 of Weisselberg, but those blade segments cannot be regarded as cutting edges because they flex backwards contrary to the direction of rotation, so that they drag along the inner surface of the cylindrical housing wall and would not be able to perform as a cutting edge but rather at best only as a dragging wiper.

For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 1, 2 and 10 to 12 as obvious over Sperber in view of Hirsch et al. and Weisselberg.

6) Referring to section 7 on pages 7 to 9 of the Office Action, the rejection of claims 13, 15 and 16 as obvious over Sperber in view of Hirsch et al. and Weisselberg, and further in view of the English translation of EP 0 505 707 (Motan) is respectfully traversed.

Claims 13, 15 and 16 depend from claim 1, which has been discussed above in comparison to Sperber in view of Hirsch et al. and Weisselberg. The dependent claims are patentably distinguishable over the prior art already due to their dependence. Namely, Motan considered in combination with the above references would not have provided any additional suggestion toward the features of present claim 1. Just like Sperber, Motan also provides leakage air vent passages (12, 14, 15) to vent leakage air and direct the leakage air back into the supply chute in the proper supply flow direction. Also, just like Sperber, Weisselberg and Hirsch et al., Motan also aims to improve the effectiveness of the seal achieved between the radially outer ends of the cellular wheel webs and the inner surface of the cylindrical housing wall, particularly by

providing a circumferentially thicker or circumferentially extended portion near the axial center of each cellular web. That limits any air leakage to the axial end portions of the cellular webs, whereby this leakage air is then directed out through the vent passages. Such teachings would not have motivated a person of ordinary skill in the art to instead purposely allow a radial spacing gap between the gap seals and the cylindrical housing wall, and to provide an injection nozzle to establish a reduced pressure that prevents air leakage. Namely, to the contrary, the teachings of Motan expressly disclose and assume that air leakage is an unavoidable fact that must be minimized through special measures. Also, because the cellular wheel sluice of Motan is not an axial blow-through sluice, there would have been no suggestion to provide an axial blow-through injection nozzle. Thus, even considering the teachings of Motan together with the above discussed references, the present invention still would not have been suggested.

Further contrary to present claim 15, the cellular wheel webs of Motan do not have cutting edges that extend at a circumferentially skewed slant to the horizontal axis or with a slight helical shape about the horizontal axis. The Examiner has referred to cell wheel bars 3 and 4 in Fig. 5, but actually the cell wheel bars or webs 3 and 4 are not shown to have a circumferentially skewed slant or helical shape, but rather have a shape that extends axially parallel to the axis with a circumferentially offset axial linear portion in the center thereof.

For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 13, 15 and 16 as obvious over Sperber in view of Hirsch et al., Weisselberg and Motan.

7) Referring to section 8 on pages 9 and 10 of the Office Action, the rejection of claim 14 as obvious over Sperber in view of Hirsch et al. and Weisselberg and further in view of US Patent 5,341,966 (Blankmeiser et al.) is respectfully traversed.

Claim 14 depends from claim 1, which has been discussed above in comparison to Sperber in view of Hirsch et al. and Weisselberg. Dependent claim 14 is patentably distinguishable over the prior art already due to its dependence from claim 1. Namely, even when considering the teachings of Blankmeiser et al. in combination with the three references discussed above, the features of claim 1 would not have been suggested. The cellular wheel sluice of Blankmeiser et al. is not an axial blow-through sluice with a horizontal rotation axis. Instead, the sluice wheel rotates about a vertical axis. Furthermore, there is no problem of air leakage between radially outer edges of cellular wheel webs or gap seals and a cylindrical housing wall, because instead the cylindrical wall 12 rotates along with the inner hub 23 (col. 2 lines 60 to 64). Therefore, there is absolutely no need for a gap seal between a radially outer edge of a cellular web and an inner surface of a cylindrical housing wall, because there is no relative motion between those components in the apparatus of Blankmeiser et al. Instead, there is only relative motion between the rotating cylindrical components and

the stationary planar walls 13 and 14, so that Blankmeiser et al. provides seals 15 only at those locations. That would not have suggested anything about gap seals to be provided at the radially outer ends of cellular seal webs in an axial blow-through cellular wheel sluice.

Claim 14 further recites a wear resistant bushing provided on the inner surface of the cylindrical wall and a wear lining provided on the inner surface of the vertical walls of the housing. While Blankmeiser et al. provide wear resistant material for seal rings 17, that still would not have suggested to provide a wear resistant bushing on the inner surface of a cylindrical wall, and a wear resistant lining for the vertical housing walls, because Blankmeiser et al. does not have relative motion causing wear at those locations.

The above discussion of the other references is incorporated here by reference, in consideration together with Blankmeiser et al. None of the references in the combination provide any suggestions toward the above discussed features of the invention.

For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claim 14 as obvious over Sperber in view of Hirsch et al., Weisselberg and Blankmeiser et al.

8) New dependent claims 17 to 19 depend from claim 1 and recite additional features that further distinguish the invention over the prior art. The Examiner is respectfully requested to consider these features in comparison to the prior art. Claim 17 specifies that the radial spacing gap is from 0.2 mm to

0.5 mm. The references do not suggest such a radial spacing gap. Claim 18 recites that each dosing chamber has a substantially trapezoidal, annular sector cross-sectional shape, and the blow-out hole has a substantially trapezoidal, annular sector opening shape. This makes clear that the blow-out hole has a shape matching that of the cross-section of the dosing chamber, so as to achieve the best blow-out flow of the bulk material out of the dosing chamber, and also to ensure the above discussed pressure reduction profile of the injected transport air passing through the dosing chamber and out through the blow-out hole. The references would not have suggested such features. Claim 19 recites that the opening shape of the blow-out hole has an area approximately corresponding to an area of the cross-sectional shape of a dosing chamber. This also ensures the proper flow and pressure profile of the injected transport air as discussed above. The references would not have suggested such a feature. Only Sperber seems to disclose the cross sectional shape and area of the blow-out hole in comparison to the cross-section of the dosing chamber, and it is seen that the shape and area of the blow-out hole are smaller than and significantly different from the shape and area of the dosing chamber (see Fig. 4 of Sperber).

9) New independent claim 20 defines inventive subject matter that is patentably distinguishable over the prior art as discussed above. Claim 20 is directed to a blow-through cellular wheel feeder with a horizontal rotation axis, with gap seals made of a hard material with a hardness equal to that of a metal, with a radial spacing gap between each gap seal and the cylindrical

housing wall, and an injector nozzle arranged and adapted to blow a stream of transport gas through the blow-in hole into the dosing chamber. This combination of features would not have been suggested by the prior art as discussed above. The dependent claims 21 to 28 recite additional features that the Examiner is respectfully requested to consider in comparison to the prior art references. The references are silent or contrary to these additional recited features.

10) Favorable reconsideration and allowance of the application, including all present claims 1, 2 and 10 to 28, are respectfully requested.

Respectfully submitted,

WFF:he/4959
Enclosures:
Transmittal Cover Sheet
Term Extension Request
Form PTO-2038

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